

# KENTUCKY SITE BANK EVALUATION

August 2007



**Governor's Office of Energy Policy**

**Commonwealth of Kentucky**



[www.energy.ky.gov](http://www.energy.ky.gov)

## 1.0 INTRODUCTION

Kentucky is uniquely situated to be in the forefront of the nation's synthetic fuels industry. The Commonwealth has an abundance of coal, a proven workforce, and a state government united in support for the concept of energy independence for the United States.

On April 21, 2006, Governor Ernie Fletcher signed into law the Kentucky Energy Security and National Leadership Act ([HB 299](#)). The Act requires the [Office of Energy Policy](#) (OEP) to develop and implement a strategy for production of transportation fuels and synthetic natural gas from fossil energy and biomass resources.

In support of this Act and to further the [Governor's Energy Strategy](#), OEP undertook to establish a "site bank" of sites in Kentucky suitable for commercial-scale coal-to-liquids (CTL) and coal-to-gas (CTG) projects. OEP's goal was to identify locations in or near both the Eastern and Western Kentucky coal fields. Each site must be capable of accommodating a plant having at least 10,000 barrels per day output in liquid fuels, or the equivalent thousands of cubic feet per day of pipeline quality synthetic natural gas. This report summarizes the results of the OEP site bank initiative.

The results of this initial assessment of potential sites for CTL/CTG plants indicate that Kentucky has properties and infrastructure available to attract developers, today, for such projects. The initial 19 nominated sites are ranked according to their suitability for commercial CTL/CTG projects as shown on Page 11. Sites not immediately ready are sponsored by entities who understand the infrastructure and engineering issues necessary to prepare those sites for development.

OEP plans to maintain the site bank, adding other sites as they are nominated and evaluated. It is not the intent of OEP that this be a final list, but that the process will be an ongoing one. OEP may also develop a site bank relating to facilities for producing transportation fuels more specifically from agricultural or other biomass resources.

### 1.1 *CTL/CTG: Basics & Industry Overview*

Gasification breaks down a carbon-based "feedstock" into its basic constituent elements using high temperatures, pressure, and in some instances, a catalyst. This process enables the separation of pollutants and other gases to produce a clean synthesis gas (or "syngas"), which can then be burned for efficient electricity generation or converted into clean liquid transportation fuels, chemicals, or synthetic natural gas.

Gasification is not a new technology. Blast furnaces were producing synthesis gases more than 150 years ago. The production of synthesis transportation fuels, primarily from gasified coal and using the Fischer-Tropsch process, experienced a dramatic increase during World War II. According to the U.S. Department of Energy (DOE), more than 92 percent of Germany's wartime aviation fuel and half of its petroleum came from synthesis fuel plants.

China and South Africa are the world leaders in gasification. North America's 15% share of the world syngas capacity is located exclusively in the United States, with 20 gasification-based plants in operation, the majority of which are chemical producers. With recent high petroleum and natural gas prices, DOE reports 27 additional gasification projects are under development in the United States, including CTL, CTG and Integrated Gasification Combined Cycle (IGCC) (following chart).

<b>GASIFICATION-BASED PROJECTS IN DEVELOPMENT IN THE U.S.</b>				
<b>Project Owner</b>	<b>State</b>	<b>Fuel</b>	<b>Products</b>	<b>Mwe*</b>
American Electric Power	OH	Coal		600-1,200
Baard Generation	OH	Coal	Polygen	200
<b>Cash Creek Generation (Erora)</b>	<b>KY</b>	<b>Coal</b>		<b>675</b>
Clean Coal Power Resources	IL	Coal		2,400
DKRW	WY	Coal	Polygen	350
Duke/Cinergy	IN	Coal		600
Energy Northwest	WA	Coal		600
Erora Group	IL	Coal		675
Excelsior Energy	MN	Coal		530
First Energy/Consol	OH	Coal		500
Florida Power & Light	FL	Coal		850
<b>Global Energy Pioneer</b>	<b>KY</b>	<b>Coal</b>		<b>550</b>
Global Energy Lima	OH	Coal		550
Leucadia National	LA	Coal		430
Madison Power	IL	Coal		500
Mohave Generating Station	CA	Coal		900-1,000
Mountain Energy	ID	Coal		500
Orlando Util./Southern	FL	Coal		285
Power Holdings	IL	Coal	SNG	400 (stm)
Rentech	WY	Coal	Diesel	105
Royster Clark/Rentech	IL	Coal	Polygen	25
Southeast Idaho Energy	ID	Coal		500
Steelhead Energy	IL	Coal		545
Synfuel	OK	Coal		600
Tondu Energy	IN	Coal		640
Xcel Energy	CO	Coal		150
Otter Creek	MT	Coal	Diesel	100,000 b/d

Source: [Gasification Technologies Council](#)

\* Megawatt (electrical output)

## **1.2 Environmental Benefits of Gasification**

Since the gasification process occurs in an oxygen-limited state, many pollutants, such as sulfur compounds, are converted to more easily handled compounds (such as hydrogen sulfide) that can be treated in a process stream, rather than more difficult compounds (such as SO<sub>x</sub>) that have to be treated as flue/stack gas streams in conventional combustion processes. Other pollutants (such as NO<sub>x</sub>, particulates, mercury, heavy and light metals) can also be treated relatively easily, compared to conventional combustion.

Due to the high reaction temperature and reduced oxygen environment, other organic contaminants (tars, oils, PCBs, furans) are generally destroyed in the gasification process. Additionally, carbon (in the form of carbon dioxide) can be extracted relatively easily and at high pressure for beneficial use, such as enhanced oil recovery, or sequestered. The carbon dioxide must be removed in the gasification process regardless of the ultimate fate of the carbon. With carbon capture, the carbon dioxide must be compressed to 2000 psi, resulting in a 3-4% increase in cost. Ideally this carbon dioxide could be used for enhanced oil recovery. This requires suitable opportunities within a feasible distance from the plant or adequate infrastructure (i.e., carbon dioxide pipelines) to ship the carbon to more distant areas with a need for the product. If sequestration, without enhanced recovery or resale, is the chosen alternative, there is an increased capital and operating cost.

CTL transportation fuels produced from the Fischer-Tropsch process are cleaner than conventional gasoline and diesels. When burned in conventional engines, they have lower particulate and mercury emissions, almost zero sulfur emissions, and no measurable toxic pollutants. Finally, gasification is an efficient method of producing elemental hydrogen for use in fuel cells and future transportation fuels.

## **1.3 CTL/CTG Benefits for the Commonwealth of Kentucky**

The United States currently imports almost 60% of its petroleum needs, nearly half of which come from highly unstable regions and countries. The [Energy Information Administration](#) predicts that this dependence on imports will grow to over 70% by 2025 unless the United States takes aggressive steps to develop domestic energy supplies.

To combat this risk, the United States has available the world's largest alternative liquid fuels resource base in the form of coal, biomass, and oil shale to substitute for conventional oil imports. Development of alternative fuels from our resources can move us toward transportation fuel

independence, while at the same time creating millions of jobs, fostering development of new technology, enhancing economic growth, and reducing trade and budget deficits.

For Kentucky, as well as other states, the CTL/CTG industry represents local industrial/economic development; more stable prices for transportation fuels and natural gas; improved and expanded educational opportunities; and long-term markets for Kentucky coal. A typical CTL plant, with an output of 10,000 barrels per day, can create more than 700-1000 construction jobs, 190 full-time jobs on-site, about 240 mining jobs and a significant number of indirect jobs throughout the region. A growing domestic CTL/CTG industry also ensures a stable, long-term market for Kentucky coal.

However, CTL/CTG facilities are costly to construct. For example, a 10,000 barrel per day CTL facility costs roughly \$1 billion, while a larger scale 80,000 barrel per day CTL plant would cost upward of \$6.5 billion. Thus, overcoming these initial high capital costs through federal and state government assistance—in the form of financial and tax incentives, streamlined permitting processes, long-term contracts for the purchase of outputs, and financial guarantees—is critical to jumpstarting the domestic CTL/CTG industry.

A number of states, including Kentucky, are aggressively pursuing development of gasification facilities. The \$1 billion DOE [FutureGen](#) demonstration project—to generate electricity and hydrogen using coal gasification, while sequestering carbon—has also created significant interest in gasification technology among these states.

Current detailed information on available resources, mines, preparation plants, and river and rail transportation can be found at the OEP [Kentucky Coal Marketing Information System](#).

## **2.0 SITE BANK PROCESS OVERVIEW**

On September 22, 2006, OEP contacted industrial, commercial, energy, business, government and economic development leaders throughout the Commonwealth inviting interested parties to submit information on potential sites to be evaluated. A letter was sent to every county judge executive, state representative, state senator and area development district in the state. A deadline of October 20 was established for submitting initial information on potential sites. In response to the letter, numerous calls and questions were received from each of the groups contacted, which indicated the high level of interest in the development of alternative use of our abundant coal resources. Twenty-one sites were submitted, of which nineteen were thoroughly evaluated.

Based on a nationwide review of other similar projects, considering the needs of a successful CTL/CTG facility within the Commonwealth, and with input and guidance from knowledgeable and experienced government, energy, natural resource, and business leaders, a set of criteria was established to evaluate each site submitted.

During the fall of 2006, teams of evaluators completed preliminary research, site information evaluations and site visits for each of the sites.

Many differences are evident in the sites reviewed. Not surprisingly, the most striking relate to the region of the Commonwealth in which the site is found. Because of this difference, the proposed sites were divided into two groups, identified as sites in or near the Western Kentucky coal fields and those in or near the Eastern Kentucky coal fields.

Several sites have potential to successfully support a CTL/CTG facility. Others will require additional infrastructure support or development to be ready for this industry. As these sites are developed and the Commonwealth gains experience with the design requirements, construction and operation of the facilities, sites that may not appear ideal at this moment may become more attractive candidates.

### 3.0 CRITERIA

Every site submitted was evaluated against a set of criteria applicable to the siting and operation of similar plants around the world. Information regarding inputs and outputs for CTL and CTG plants was gathered and incorporated along with basic site needs. Relative weighting was applied to those criteria that were determined to be particularly important or for which significant cost could be expected. The goal of the evaluation was to determine which sites were most ready and most suitable for development at this time. The resulting rankings of the sites are shown in the table on page 11.

The criteria were established by first looking to the physical characteristics that are beneficial to a successful facility, such as size, location, and environmental condition. Other aspects of the site that might be detrimental or cost-prohibitive, such as potential environmental impacts to water quality or threatened and endangered species, were considered. Sensitive conditions such as wetlands and floodplains were reviewed to ensure that the proposed facility would be technically, legally, and environmentally feasible. The needs of a typical facility for feedstock, power, transportation, and workforce were factored as well. The geologic stability of the site and the potential for sequestration of captured carbon was preliminarily evaluated.

Participants in the development of the criteria included SMG, the University of Kentucky's [Center for Applied Energy Research](#), the [Kentucky Geological Survey](#), the OEP, and the [Environmental and Public Protection Cabinet](#). Existing reports such as the Southern States Energy Board's "[American Energy Security Study](#)" were reviewed and substantial information imported into the criteria.



<b>SITE EVALUATION CRITERIA SUMMARY</b>	
<b>Physical Characteristics</b>	<ul style="list-style-type: none"> <li>• Size</li> <li>• Topography</li> <li>• Access &amp; Control</li> <li>• Floodplains &amp; Wetlands</li> </ul>
<b>Geologic Factors</b>	<ul style="list-style-type: none"> <li>• Seismic Stability</li> <li>• Sequestration Potential</li> <li>• Other Geologic Assets</li> </ul>
<b>Other Site Characteristics</b>	<ul style="list-style-type: none"> <li>• Existing Site Hazards</li> <li>• Presence of Oil/Gas Wells &amp; Lines</li> <li>• Existing Land Use</li> <li>• Road Access</li> <li>• Cooling/Process Water Resources</li> <li>• Airport Proximity</li> </ul>
<b>Proximity to Sensitive Areas</b>	<ul style="list-style-type: none"> <li>• Proximity to Public Access &amp; Class I Visibility Areas</li> <li>• Threatened &amp; Endangered Species</li> <li>• Cultural Resources</li> </ul>
<b>Regulatory &amp; Permitting</b>	<ul style="list-style-type: none"> <li>• Air Quality</li> <li>• Non-attainment/Maintenance Areas</li> <li>• Water Resources</li> </ul>
<b>Electricity Transmission</b>	<ul style="list-style-type: none"> <li>• Power availability</li> <li>• Grid proximity</li> <li>• Voltage</li> <li>• Rights-of-way</li> </ul>
<b>Material &amp; Fuel Delivery</b>	<ul style="list-style-type: none"> <li>• Distance to rail/barge facility access</li> <li>• Delivery mode flexibility</li> <li>• Access to natural gas pipeline</li> <li>• Coal supply environment</li> </ul>
<b>Workforce Availability</b>	<ul style="list-style-type: none"> <li>• Construction workforce</li> <li>• Operational workforce</li> </ul>



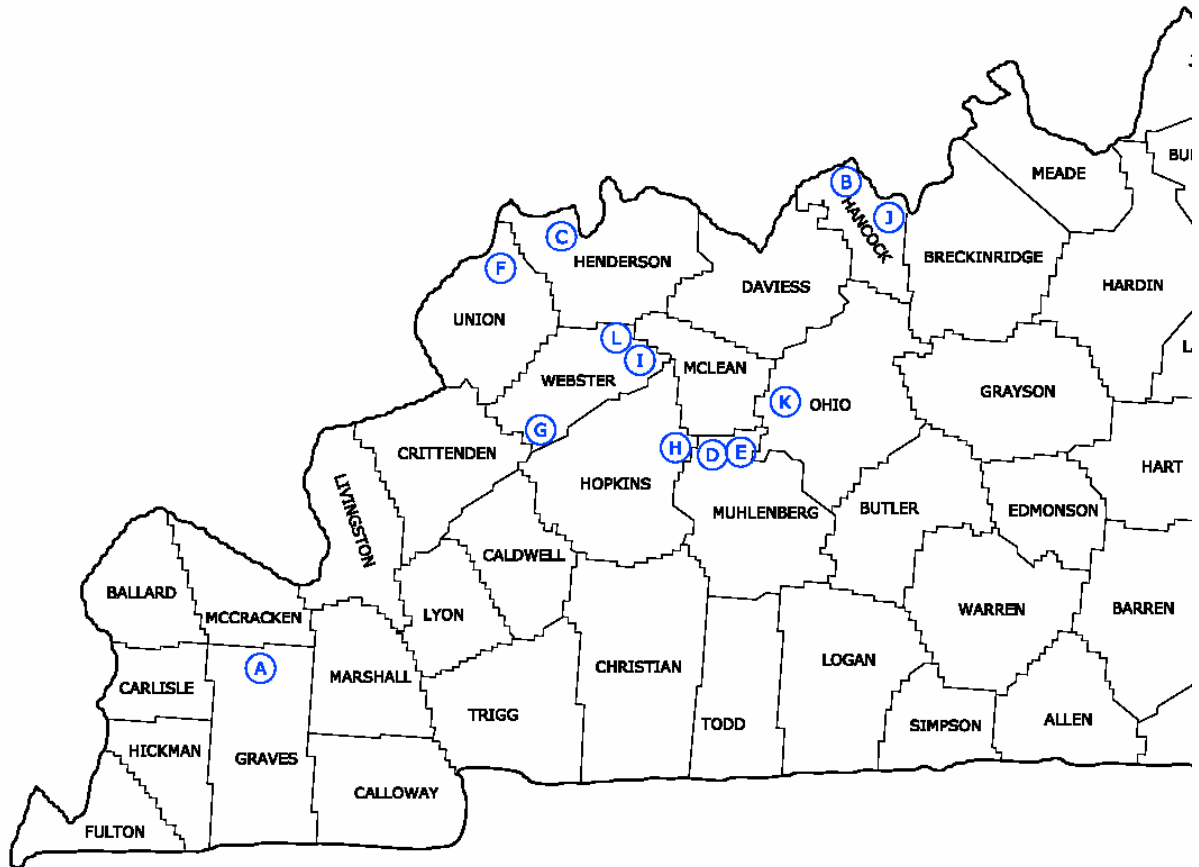
## **4.0 SITE EVALUATIONS**

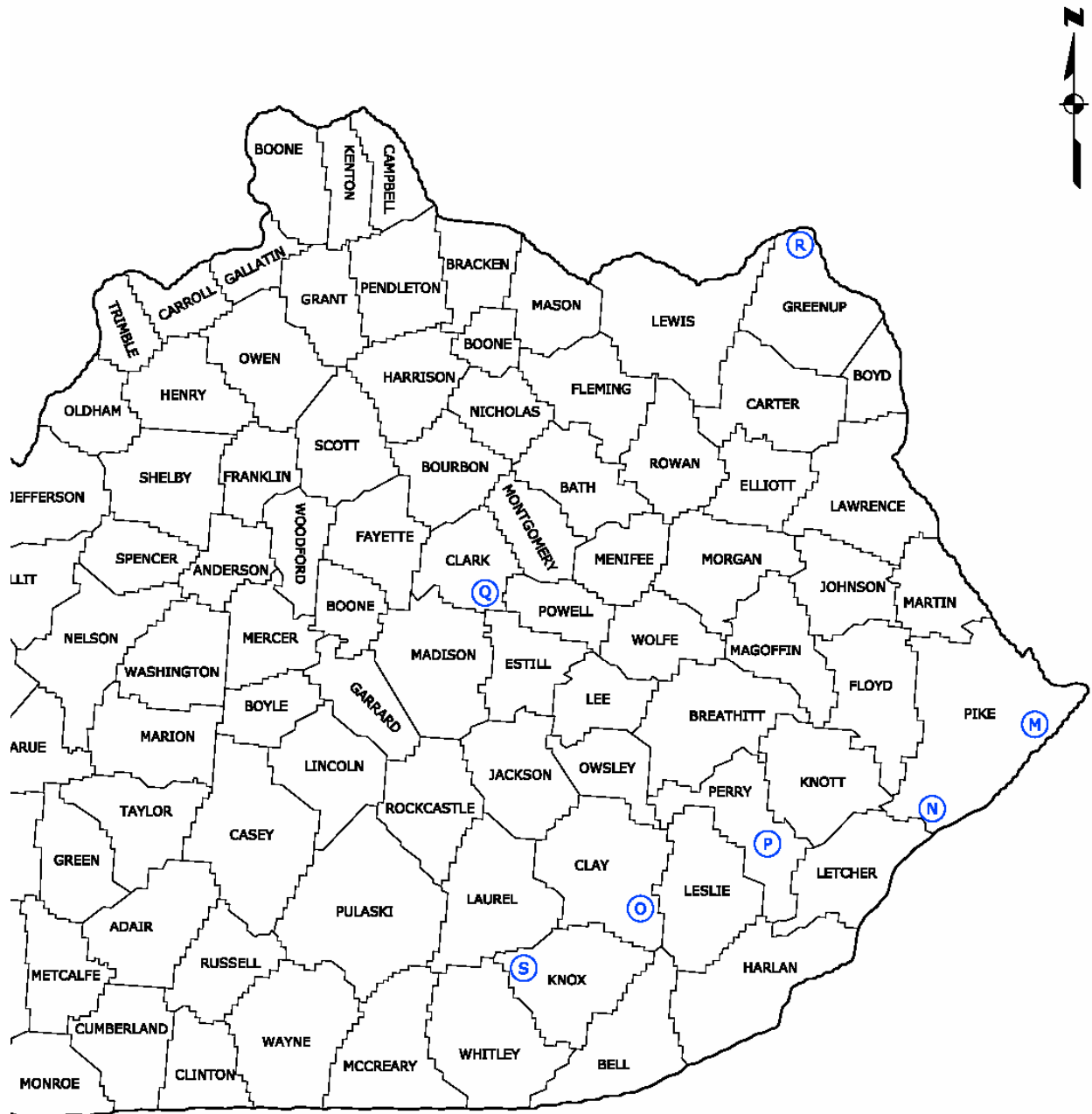
Each site was evaluated and ranked based upon a site visit, information submitted by the sponsor, and substantial research. The criteria were used to numerically rank the sites and develop a comparison among sites within the same geographic region. Each site sponsor was afforded the opportunity to review the evaluation of the site and provide additional information helpful to the process.

Twelve sites are located within or near the Western Kentucky coal fields and have been evaluated as a group. Seven sites are located within or near the Eastern Kentucky coal fields and have also been evaluated as a group. Following is a map depicting the general location of the sites. Short descriptive summaries for each site, highlighting their strengths and providing additional information on how they can be improved for CTL/CTG development are also included. Full site descriptions and more detailed results of site evaluations may be obtained by contacting the OEP.

# PROPOSED PROPERTIES FOR SITE BANK

A	PURCHASE REGIONAL INDUSTRIAL PARK
B	HANCOCK COUNTY - LEWISPORT
C	AMERICAN ELECTRIC POWER - HENDERSON
D	BRIER CREEK - KENAMERICAN COAL
E	PARADISE MINE - KENAMERICAN COAL
F	RIVER VIEW COAL - ALLIANCE
G	WEBSTER COUNTY - ALLIANCE
H	HOPKINS COUNTY - ALLIANCE
I	STEAMPORT, ALLIED RESOURCES
J	HANCOCK COUNTY - SKILLMAN BOTTOM
K	D.B. WILSON POWER STATION
L	ADJACENT PROPERTY - REID-GREEN POWER STATION
M	CHISHOLM MINE, PHELPS
N	TECO COAL - PREMIER ELKHORN, MYRA
O	CLAY COUNTY INDUSTRIAL PARK
P	TECO COAL - PERRY COUNTY COAL - HAZARD
Q	J.K. SMITH POWER STATION
R	SOUTH SHORE - GREENUP COUNTY
S	CH DEVELOPMENT - CORBIN





WESTERN KENTUCKY SITES	COUNTY	DESCRIPTION OF SITE	SCORE	% OF POSSIBLE SCORE
	Graves	Purchase Regional Industrial Park	832	69.28%
	Hancock	Lewisport - Hancock County River Front	833	69.36%
	Henderson	American Electric Power property west of Henderson	719	59.87%
	Muhlenberg	Brier Creek, Breman	768	63.95%
	Muhlenberg	Paradise Mine, Central City	796	66.28%
	Union	River View Coal	1004	83.60%
	Webster	Hopkins Co. Coal	913	76.02%
	Hopkins	Hopkins Co. Coal	976	81.27%
	Webster	Steamport	1064	88.59%
	Hancock	Skillman Bottom - Hancock County	1032	58.93%
	Ohio	D.B. Wilson Power Station	1118	93.09%
	Webster	Property adjacent to Reid-Green Power Station	1068	88.93%
EASTERN KENTUCKY SITES	COUNTY	DESCRIPTION OF SITE	SCORE	% OF POSSIBLE SCORE
	Pike	Chisholm Mine, Phelps	832	69.28%
	Pike	Premier Elkhorn, Myra,	832	69.28%
	Clay	Clay County Industrial Park	832	69.28%
	Perry	Perry Co. Coal-Hazard	1026	85.43%
	Clark	J.K. Smith Power Station	1057	88.01%
	Greenup	South Shore, Greenup County	1087	90.51%
	Knox/Whitley	CH Development Corbin	1051	87.51%

Total Possible Score - 1201

### ***Purchase Regional Industrial Park***

This site includes over 2000 acres of flat land in Graves County with excellent highway access and existing internal roads that could be upgraded for heavy hauling. Highway access is expected to improve with anticipated development of federal interstate highways in this region. The site's location adjacent to a railroad indicates that rail access could be easily developed. Primary building sites are not within the 100 year flood plain.

Located within a high seismic risk area and a lack of features that contribute to successful carbon sequestration limit the site's geologic assets. Potable water and basic electricity are available, though the water resources typically required for a CTL/CTG facility are not. Sewer lines are located several miles distant and would have to be brought to the site. A significant electric substation is located 3 miles away which could provide access to additional power and a transmission point for excess electricity. The site lies within 20 miles of several state parks and a national wildlife refuge. Four state listed threatened/endangered species were identified associated with the site's general location. These issues will require further investigation and planning prior to development.



Though outside the Western Kentucky coal fields, the area has access to coal, with one existing and another planned coal blending facility nearby. Substantial coal shipments occur on the Ohio and Mississippi Rivers which are within 20 miles of the site. Barge access is located at a distance of about 20 miles along the rivers. The labor market includes more than 130,000 workers. Additional local research indicates in excess of 600,000 within a 1-hour commute. The site scored 832, representing about 69% of the total possible score.

---

### ***Hancock County, Lewisport***

This 1100 acre, predominantly flat site is located on the Ohio River. Access is available via 2-lane paved roads, though portions may require improvement for heavy hauling. River frontage is adequate to construct a barge facility. Rail access is currently not available but could be developed by extending a spur. Riverfront areas are within the floodplain but do not constitute a large percentage of the site. Small wetland areas on the site could be managed without significant impact to development.



An 8-inch water line is present although sewer service is not presently available. Natural gas is located about 1 mile east. 161kV & 345 kV lines are located 3000-feet to the south. The site drains to the Ohio River, which should also provide adequate water for process purposes.



The site's geologic assets are limited, though potential sequestration receiving beds and gas production lie within 5-miles. Development of this site would be the first industrial facility in this area. An airport is currently under construction just to the southwest of the site. The site lies approximately 70 miles from a Class I Visibility Area. A state listed threatened/endangered species is associated with the site's general location. A house with national historic significance is located on the western portion of the site. These issues must be addressed in site planning and development.

The site's location within the Western Kentucky coal fields should provide adequate coal supply. The overall labor market for the site includes nearly 250,000 workers. The site has received an overall score of 833, representing about 69% of the total score possible.

### ***Henderson County, AEP Property***

The proposed site is located on the Ohio River, west of Henderson. It contains more than 4700 acres, the majority of which is flat. Substantial portions are included in the 100-year flood plain. This issue, potential wetlands impact, and an adjacent wildlife management area must be included in site planning. Geologic assets are positive, including significant development of shallow and deep oil fields onsite and nearby. A possible sequestration bed lies within 5 miles of the site.



2 Federal & 8 State threatened/endangered species are associated with the site's general location, including species relying on wetlands as primary habitat. The site is located within 2-miles of an air pollutant non-attainment area, and within 1 mile of a small airport. These issues will require further investigation and planning prior to development.



Municipal water is available onsite, and additional water supply may be available from the adjacent Ohio River. The closest sewer connection is 9000-feet away. Road access is 2-lane paved road which may require upgrading to support substantial coal or other industrial haulage. Rail and barge access, and natural gas service, are available within approximately 2 miles although the site's excellent Ohio River access may make barge facility development possible on site. A suitable electric transmission line (161 kV) is reportedly 5-miles distant.

Located in the Western Kentucky coal fields, coal supply should not be an issue. Immediate access to the Ohio River allows the possibility of constructing a barge facility, and road improvements to support coal delivery by truck are options for addressing transportation limitations at the site. The labor market includes 250,000+ potential workers - one of the strongest in Kentucky. The AEP Geneva site achieved a score of 719, representing 60% of a total possible score.

---

### ***Brier Creek, KenAmerican Resources, Inc.***

KenAmerican offers this reclaimed former strip mine of more than 750 acres in Muhlenberg County. Road access includes a 2-lane paved road. Rail service could be rebuilt and activated on an existing right of way from a former onsite spur. Future development would need to ensure adequate foundation design due to the preponderance of fill from site reclamation.



The site's geologic assets are fair. It is not within the floodplain and there are few identified wetlands. Right of way from an existing 69kV line may support access to higher voltage lines. Natural gas transmission lines lie nearby. Access to and adequacy of several potential water sources must be addressed. These include on-site ponds; the nearby Green River, Pond River & Andren Lake; and significant potential water storage beneath the site. Several public access areas are located nearby. 4 small airports are located within 10 miles of the site. The site drains into Brier Creek, a TMDL approved, impaired stream. The site is located within 65 miles of a Class I Visibility Area. 4 state listed threatened species were identified associated with the site's general location. Due to the site's prior use as a coal mine, it is unlikely that critical habitat for these species would be impacted by development of the site.



Muhlenberg County is a highly productive coal county with a major coal producer in the area as well as other coal suppliers able to provide fuel to this site. The labor market identified by the Kentucky Economic Development Cabinet includes 10 Kentucky counties with a total available workforce of over 150,000 workers. The site scored a total of 768 points, representing approximately 64% of the total points available.



### ***Paradise Mine, KenAmerican Resources, Inc.***

KenAmerican offers this 650 acre former mine site in Muhlenberg County. Geologic assets are fair, including nearby subsurface structures favorable for sequestration. Some nearby floodplains and wetlands lie predominately to the south and east which should not directly impact CTL development. Site access includes certified coal roads and a rail right of way adjacent to the site. The site contains active, incomplete and abandoned gas wells.



Basic electrical power is available via 69 kV lines. Suitable access points to upload power are available within 20 miles of the site, and may be accessible via existing right-of-way. Further confirmation of adequate water supply from the nearby Green River, a large pond onsite, and reported flooded mine works will be needed. While no federal threatened/endangered species are associated with this general location, 10 state listed species are identified. As the site was previously entirely mined and disturbed it is unlikely development would impact critical habitats.



The site lies within 10 miles of 2 airports and 62 miles from a Class I Visibility Area. Runoff or water discharge would be to a 303(d)-Listed Stream. Reclamation from prior mining included returning in place the 100-125 feet of unconsolidated overburden previously removed. These factors must be considered when developing & permitting the site.

An abundance of accessible coal is available nearby, including a site with more than 20 years of #9 coal reserves and more than 3 years of #11 coal reserves producing 4.5 million tons per year. An excess of 155,000 workers are reportedly available in the Kentucky Economic Development Cabinet identified market. The site has scored a total of 796, about 66% of the total available score.

---

### ***River View Coal, Alliance Coal***

River View Coal (Alliance Coal LLC) offers more than 750 acres in Union County along the Ohio River previously used for underground mining, coal preparation, and coal refuse disposal. Portions of the site are forested and contain wetlands, though substantial tracts of un-impacted land are available for development. Geologic assets are fair.



City water and sewer are available. The property has a water withdrawal facility previously permitted up to 5000 gpm/2 mgd withdrawal. The Ohio River is adjacent and will provide an adequate resource. The site includes a barge loading facility with coal conveyors serving the site. Access also includes 2-lane paved roads. A 69 kVA line provides electricity to the site, with the closest high voltage line more than 5 miles away.



Several wildlife management or natural resource areas are located within 10 miles of the site, and threatened/endangered species are associated with the site's general location although historic use of the property indicates that the primary building areas should not impact critical habitat. No historic sites are apparent on the site. While it is unlikely these factors will be significant due to the site's prior uses, further investigation may be required prior to development.

Union County offers annual coal production of greater than 5 million tons, with up to 8.5 million available by 2008. Additional coal is available from adjacent counties as well. The labor market identified by the Kentucky Economic Development Cabinet includes 7 counties with an available labor pool of greater than 150,000 workers. The site has scored 1004 total points, representing about 84% of the total available points.



### **Webster County, Alliance Coal**

Alliance Coal offers a 2,500 acre site in Webster County currently utilized for refuse disposal associated with a large underground coal operation. The property has rolling topography due to prior mining and spoil placement - groundwork would be required prior to construction. Road access includes several paved 2-lane roads. A rail spur to the former tipple from the CSX line is located on site. The site does not lie within a 100-year floodplain.



Impounded freshwater ponds may need to be surveyed to confirm whether wetlands would be impacted by development. Investigation into potential environmental impact from prior operations is required. While municipal water/wastewater access is reportedly available, CTL development would require additional water supply. A 69 kVA overhead power line runs across the site – a larger transmission line was identified within 5 miles of the site. Natural gas availability is unknown, though mapping indicates 3 large interstate lines lie between 5 and 10 miles away.



An airport is located adjacent to the east of the site. Three state listed threatened/endangered species are associated with the site's general location. Although unlikely to pose obstacles due to the site's historic uses, further investigation in these areas is needed.

The largest producing mine in Kentucky (4.9 million tons) is located adjacent to this site, which is also adjacent to a reportedly large coal reserve (>11,000 acres) currently being considered for development. The civilian labor force for the Webster County area is 215,992. The site achieved a total score of 913 which represents about 76% of the total available score.

---

### **Alliance Coal – Hopkins County**

Alliance Coal, LLC offers more than 10,000 acres in Hopkins County for development. Most of the property is flat or gently sloping, however some groundwork would be required for construction. A coal preparation plant and associated storage with rail load-out are operating on site. Geologic assets are fair. Site access includes paved 2-lane and gravel mine haul/county roads. The P&L railroad runs east/west through the middle of the property and a rail spur from the CSX railroad extends east into the site with a unit train loop at the coal preparation plant. Current and past land utilization indicate zoning will not be an issue. disonville potable water and sewer is reportedly accessible at the site, and adequate cooling and process water resources are likely available on site. Two overhead power lines (69 & 161 kVA) and gas lines, collectors and a compressor station are present.



Proximity to a nearby airport (~4 miles) must be considered in site planning. Further investigation into potential impact on cultural/historical resources & threatened/endangered species may be required. The site's proximity to a Class I Visibility Area (~72 miles) will be considered in air pollution permit conditions. Portions of the site are listed within the 100-year floodplain and/or designated as wetlands, though there are substantial un-impacted portions available for development.



Hopkins County is located within the Western Kentucky coal fields, with active mining and adequate coal supply nearby. The labor market identified by the Kentucky Economic Development Cabinet encompasses 7 counties and includes over 100,000 potential workers. The site scored a total of 976 points, representing 81% of the total available points.

### ***Steamport – Webster County***

This 500 acre site has more than 8,000 feet of Green River frontage and is adjacent to an active underground mine which could provide coal via overland conveyor. A barge loading facility, including truck unloading hopper & conveyor system, operates onsite. The majority of the site appears to be slightly below reported 100 year flood elevation although mapping is not available. By addressing this potential issue, the majority of this property would be an excellent building site.



No Federal or state threatened/endangered species are associated with the site's general location. The adjacent Green River could provide an adequate water source as well as a major transportation avenue. High voltage transmission lines (138 kVA & 345 kVA) traverse the site. Road access includes 2-lane paved roads, some of which are approved for extended weights. Access to several large natural gas pipelines is available, including a 6-inch pipeline running along the western boundary of the property. In addition, 7 underground natural gas storage reservoirs are currently under review for development nearby.



Previously performed archeological studies of onsite & adjacent areas have shown no significant sites, though additional review should be conducted prior to development. The site lies 80 miles from a Class I Visibility Area. The nearby labor market includes a workforce of more than 200,000 potential workers, making it one of Kentucky's larger labor markets. The site has scored 1064 which represents almost 89% of the total available score.

---

### ***Hancock County, Skillman***

This property includes more than 1,000 acres located on the Ohio River and accessible via 2- and 4-lane paved roads. A CSX rail line is located north of the site adjacent to an operating manufacturing facility. Among the tracts comprising this site are over 870 substantially flat acres with excellent building sites, and about 100 acres along the river that could be used to construct a barge facility.



Geologic assets include low risk for seismic activity and structures favorable for carbon sequestration. Ready access to the Ohio River provides a reliable source for process and cooling water. The site is adjacent to several high voltage transmission lines (161 kV & 138 kV) and an adjacent substation. Natural gas transmission lines near the site include 6- and 8-inch lines. No federal or state threatened/endangered species are listed as associated with the site's general location.



The site is located less than 60 miles from a Class I Visibility area. Local and state parks lie at a distance of 20-30 miles. Surface water drainage from the site is to the Ohio River, a 303(d) impacted body. Previous investigation has identified several potential archeological sites on the property. These issues will require further investigation and planning prior to development.

Within the Western Kentucky coal fields, numerous potential coal suppliers offer plenty of fuel with excellent access to transportation both to and from the site. Nearly 250,000 workers are available within the overall labor market. The Skillman site in Hancock County has scored a total of 1032 which represents about 86% of the available score.

### ***Big Rivers, D.B. Wilson***

The D.B. Wilson Generating Plant, sponsored by Big Rivers Electric Corporation, includes more than 2,300 acres. Located in Ohio County on the banks of the Green River, this site and its infrastructure was built to handle two generation plants with only one constructed at this time. This leaves excess capacity in the landfill and operating barge load-out available for use by a CTL/CTG plant.

***The primary building site is ready for construction.***



The site is flat over much of the acreage. Operating areas are surrounded by a dike to prevent flood impact. Geologic assets are fair with a low risk of seismic activity and both deep and shallow oil fields are located below the site. Site access includes 2-lane paved roads and substantial barge transportation capacity. Rail access will require reconstruction of a former rail bridge. Potable water is generated on site and water for process/cooling can be easily obtained from the Green River. Electrical service is generated on site by the D.B. Wilson plant, which also provides a site to upload excess electrical power. Sewage is directed to an on-site sewage treatment system.



Ohio County is within the Western Kentucky coal fields. A large Peabody operating mine is located close to the site to the east. Numerous other coal suppliers are also accessible to the site by barge delivery. The labor market includes 9 Kentucky counties and 1 county in Indiana, for a total of more than 175,000 potential workers to staff the construction and operation of the facility. The site scored a total of 1118 points which represents about 93% of available points.

---

### ***Big Rivers, Reid Green***

This site is located adjacent to a power generation station along the Green River in Webster County and includes at least 458 relatively flat acres, with the potential to add up to 600 acres. Some tree clearing and grading would be required. Road access is excellent, including paved 2- and 4-lane roads. A rail line runs across the north end of the property, and a barge facility lies nearby. Geologic assets include low risk for seismic activity, shallow and deep oil fields in the area, and receptive strata for carbon sequestration.



A gas transmission line and high voltage power lines (69kV & 161 kV) cross the property. Natural gas and basic electrical service are available with municipal water and a wastewater treatment facility located nearby. Adequate water resources for process and cooling needs are available, though runoff is to an impaired creek which may affect discharge permit conditions.



Some areas may lie within the 100-year floodplain. Two streams run through the property, including a large associated wetland near the site's center. Two state listed threatened/endangered species were identified associated with the site's general location. The site is located 80 miles from a Class I Visibility Area. Further investigation and planning to address these issues would be required prior to development.

The site is located in the Western Kentucky coal fields, with current production of at least 4.5 million tons per year in a two-county area. The available workforce in the area includes more than 200,000 workers. The site has scored 1068 or approximately 89% of the total possible score.



### ***Chisholm Mine, Phelps***

This former strip mine includes 562 acres and 249 additional acres for future development in Pike County, with large relatively flat areas, though required equipment may have to be grouped & placed at different levels of the remaining strip benches. Geologic assets indicate a low risk for seismic activity and shallow & deep oil fields nearby. Access includes paved 2-lane roads currently used for coal hauling. Basic electric and water service is available, and the site lies within the planned extended service area of a nearby municipal sewage treatment plant. Several natural gas companies operate in the area. Rail access is on site but would require reconstruction of a loading facility.



Three public access areas, including a wildlife management area, lie within 15 miles of the site.



One state listed threatened/endangered species is associated with the site's general location, though prior mining & timbering of the property makes it unlikely that critical habitats would be impacted. Process & cooling water sources are limited, though nearby abandoned mines may provide an adequate source. The nearest high voltage transmission line (138 kV) is more than 5 miles distant although the site is within 25 miles of a major (765 kV) line. These items may require additional planning associated with development.

The site lies in one of the most productive coal counties in the Eastern Kentucky coal fields, with numerous sources in the area to augment on-site waste coal-recovery operations. The nearby labor market includes over 75,000. The site scored a total of 832 representing about 69% of to total score possible.

---

### ***TECO Coal, Premier Elkhorn, Myra***

This previously surface mined site includes more than 500 acres available for development in Pike County collocated with an active coal mining operation producing 3,000,000 tons per year with proven reserves to produce at this rate for 20 years. Previous mining has resulted in flat building sites for development, although not all are contiguous and groundwork may be required for construction. Geologic assets include low risk zone for seismic activity and both shallow and deep oil fields under or near to the site. Road access includes 2-lane paved roads. A state listed threatened/ endangered species is associated with the site's general location, though active mining suggests this would not impede further development.



Electricity (including a 138 kV line for selling excess electricity) and natural gas transmission (including a 12-inch line) are available onsite or nearby, as are potable & municipal water. Process & cooling water demands for a CTL/CTG facility could be met by nearby sediment ponds or closed underground mines retaining water located in the immediate vicinity. These alternatives require additional investigation as part of the development process.

Pike County is one of Eastern Kentucky's most prolific coal producing counties, providing many alternatives for augmenting the excellent coal available onsite. The available labor market includes a workforce 75,000 although the site's location and the road access should swell these numbers to over 100,000. The site scored a total of 832 representing about 69% of to total score possible

### ***Clay County Industrial Park***

This site of more than 1000 acres of flat land is a reclaimed mountaintop mine. Site development should consider filled areas for appropriate foundation design. The site does not contain wetlands or areas within the 100-year floodplain. Site access includes paved 2-lane roads, with planned expansion of a nearby transportation corridor providing significant enhancement. Available infrastructure includes potable water, sewage treatment, natural gas, and electricity. Geologic assets include a low risk for seismic activity, deep and shallow oil fields in the vicinity, and target formations for carbon sequestration.



The Daniel Boone National Forest surrounds the site and two wildlife management areas lie within 7 miles of the site. A state listed threatened/endangered species is associated with the site's general location, though previous mining activity suggests development would not impact critical habitats. Potential water resources to support CTL operations may be available near the site from abandoned underground mines, with one source estimated at 460 million gallons with a recharge rate of 210,000 gallons per day. Rail access is available 3 miles east, but current transportation is limited to road. The nearest high voltage electrical transmission line is 3 miles distant. These issues may require further study or planning as part of the development process.



Clay County is located within the Eastern Kentucky coal fields with numerous sources of coal available. The nearby labor market includes more than 100,000 potential workers. The site scored a total of 832 points, representing about 69% of the total available points.

---

### ***TECO Coal / Perry County Coal, Hazard***

More than 700 acres are available at an operating coal mine site producing in excess of 3 million tons per year. Surface mining has created large flat areas unimpacted by floodplains or wetlands. (Some earthwork may be required for development.) Geologic assets include a low risk for seismic activity, shallow and deep oil fields, and target formations for carbon sequestration. Access includes paved 2 and 4-lane roads currently used for coal hauling. A rail line east of the site connects to a spur on the property with a coal load-out & unit train capacity.



Potable water, basic electrical service, & natural gas are available on site. In addition, a 12-inch natural gas transmission line is located less than a mile from the site. High voltage transmissions lines (138 kV & 161 kV) are located nearby. No federal wilderness areas, wildlife preservation areas, or native cultural resources were identified within 1 mile of the site. A state listed threatened/endangered species is associated with the site's general location, though the occurrence of its preferred habitat within this existing coal mining operation is unlikely. Process water resources include the nearby Kentucky River, though the potential for mandatory restrictions on water withdrawal during low-flow conditions is a concern. Water impoundments & nearby closed underground mines (with at least 961million gallons of water) provide adequate alternatives.



Located in the heart of the Eastern Kentucky coal fields, fuel from the on-site mine can be supplemented by numerous nearby sources. The prevailing labor market includes an available workforce of at least 70,000. Excellent road access could expand this pool to over 100,000. The site has scored a total of 1026 which represents 85% of the total available points.

### ***JK Smith Power Station, Trapp***

This site consists of a portion of the 3,200 acre JK Smith Generating station just north of the Kentucky River in Clark County, with building sites of more than 500 acres. Rezoning may be required for development. Building sites are generally rolling to flat. Several large natural gas transmission lines cross the property, providing important infrastructure but possibly requiring some relocation for development. Presence of the generating station provides a resource for electrical power and the sale of excess electricity. The adjacent Kentucky River may provide sufficient process and cooling water for CTL operations. Basic infrastructure, including potable water and natural gas are available.



Floodplains and wetlands identified at the site on the periphery and are not anticipated to impact development. No federal or state listed threatened/endangered species were identified associated with the site's general location. Site access includes 2-lane paved roads suitable for industrial hauling and a CSX rail line with a loop siding on the property large enough to support three unit trains.

Geologic assets scored below average. Nevertheless, certain geologic structures that may make carbon sequestration possible were identified. The site has been previously surveyed for historic/archeological resources and an EIS has been conducted on the property. The site does not lie within the Eastern Kentucky coal fields, requiring fuel to be transported to the facility. The nearby labor market represents a total available workforce of more than 350,000 workers - one of the largest in Kentucky. The site has scored a total of 1087 which represents 91% of the total available score.

---

### ***South Shore – Greenup County***

This 500 plus acre site contains the bed of a former loop rail spur from an adjacent rail line. Substantial portions of a barge load-out remain from previous development. Both rail and barge facilities can be reactivated easily. The site is flat and the primary building sites are not impacted by floodplains or wetlands although riverfront areas are within the floodplain. Road access includes a 4-lane divided highway. Basic infrastructure (electric, potable water, sewer line & natural gas) are available at the site. High voltage transmission lines and/or right-of-way to an adjacent substation provide access for selling excess electricity. The site lies adjacent to a natural gas processing facility, and several 6-inch and larger gas transmission lines are available in the vicinity. Process water requirements can easily be met by the adjacent Ohio River.



Some environmental impact from previous operations has been addressed. Associated deed restrictions limit groundwater usage and require planning for excavation of certain areas but should not significantly impede development. The site is located near two air quality Non-Attainment areas. Two state listed threatened/endangered species were identified associated with the site's general location with habitats that include river front features found at the site. A prehistoric artifact scatter of unknown cultural affiliation was previously identified at the site but is not located within the primary building areas. These issues will require research and planning during development.

Adequate supplies of coal from a variety of sources are readily available to this site by barge and rail. The labor market includes more than 200,000 workers. The site scored a total of 1037 points representing 86.34% of the available score.

### ***CH Development, Corbin***

This property contains 776 acres bordered by a CSX rail yard. Two adjoining industrial development parks create potential for an additional 600 acres for development. The primary site is composed of a large coal refuse fill area, large ponds & a flat area with a coal preparation and load-out facility. Gas, electricity, sewage and potable water are all available at the site. A 161 kV transmission line is available adjacent to the site providing access to the power grid. Road access includes paved 4-lane roads and I-75 is within 5 miles. Geologic assets include low risk area for seismic activity, shallow & deep oil fields beneath the site, and favorable strata for carbon sequestration.



Several public access areas are located around the site. The site lies within 90 miles of a Class I Visibility Area. A few potential archaeological sites were identified in 1977 associated with development of one of the adjacent industrial parks. Water discharge will flow to Lynn Camp Creek, a 303(d) listed impacted body. Nearby Laurel Lake is an option for process and cooling water requirements, though regulatory approval would be required. Active oil wells and associated equipment at the site may have to be relocated associated with development. These issues may require further investigation and planning prior to development.



Coal refuse covering the primary site extends 80 feet deep in places, with on site reserves estimated at 28 million tons. Its location in the Eastern Kentucky coal fields offers the easy access to mined coal as additional fuel potential. The nearby labor market includes 175,000 workers. The site scored a total of 1051 representing approximately 87% of available points.

---

**For more information about these sites,  
contact the Governor's Office of Energy Policy.  
502-564-7192**



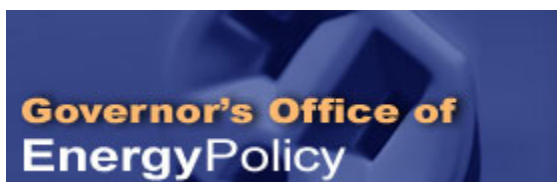
## **5.0 CONCLUSION**

A number of companies have recently announced their intention to develop coal-to-liquids and coal-to-gas facilities, and efforts are underway to secure financing for these projects. Federal and state laws are being proposed to expedite the deployment of these technologies, and a number of states are aggressively competing to attract these investments. The obstacles to developing these projects include the high cost of capital and uncertainty in the permitting process. Federal legislation, including direct financial assistance, tax incentives, and protections against predatory pricing in oil markets, will help attract capital investment by lowering the financial risks associated with these large projects and increasing returns for investors. Many states are providing additional assistance through economic development incentives and streamlined permitting processes.

The benefits of rapidly developing these projects far outweigh the anticipated costs. The United States has abundant supplies of coal, and coal gasification can provide an important domestic source of energy to protect America's economic and national security interests in the coming decades. Development of this industry in the United States will create tremendous economic and job growth, and result in overall, more stable energy prices. Production of energy by these technologies has environmental benefits as compared to current technologies. Finally, as the United States and other countries explore ways to reduce emissions of carbon dioxide, coal gasification technologies represent an important breakthrough in our nation's ability to produce the large-scale supplies of energy needed for our economy and way of life while managing CO<sub>2</sub> emissions.

The development of this Site Bank is an important step in Kentucky's renewed efforts to attract these projects. The United States abandoned its first attempt to develop a coal-to-liquid fuels industry in the late 1970s in the face of a worldwide abundance of cheap oil. Today, soaring worldwide demand for oil and natural gas is rapidly outpacing available supplies, and U.S. availability of existing supplies is increasingly at risk. With our abundant supplies of coal, skilled workforce, and expertise of our universities, Kentucky is uniquely suited to lead the way toward developing this industry. The Site Bank will help attract and educate potential project developers and serve as an introduction to state and local governments. Additional work is needed to further develop several of these sites. The Site Bank will be updated routinely as the suitability of these sites for commercial-scale gasification projects is improved and as additional sites are identified.

For additional information contact:



500 Mero Street  
12th Floor, Capital Plaza Tower  
Frankfort, KY 40601  
(502) 564-7192 or in Kentucky (800) 282-0868



[www.energy.ky.gov](http://www.energy.ky.gov)